

$X_3-Y-X_{2-4}-Y-X_{12}-Y-X_{1-7}-Y-X_4$ (SEQ ID NO:147)

where X= any amino acid
B= any amino acid except cysteine
Z= any amino acid except histidine
Y= any amino acid except histidine or cysteine --

A4
Cont

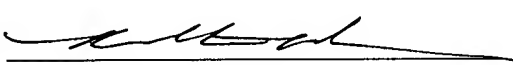
Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

REMARKS

The foregoing amendments are made to insert the sequence identification numbers into the specification.

Respectfully submitted,

Date: 9/4/02

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Version with markings to show changes made

In the specification:

Paragraph beginning on page 4, line 1 has been amended as follows:

In one aspect, an isolated, non-canonical zinc finger binding protein comprising one or more non-canonical zinc finger components that bind to a target sequence is provided. The isolated zinc finger binding protein can be provided as a nucleic acid molecule or as a polypeptide. Furthermore, the target sequence can be an amino acid, DNA (*e.g.*, promoter sequence) or RNA and, additionally, may be in a prokaryotic (*e.g.*, bacteria) or eukaryotic cell (*e.g.*, plant cell, yeast cell, fungal cell, animal such as human). In certain embodiments, the amino acid sequence of one or more of the zinc finger components is X₃-**B**-X₂₋₄-Cys-X₁₂-His-X₁₋₇-His-X₄; X₃-Cys-X₂₋₄-**B**-X₁₂-His-X₁₋₇-His-X₄; X₃-Cys-X₂₋₄-Cys-X₁₂-**Z**-X₁₋₇-His-X₄; X₃-Cys-X₂₋₄-Cys-X₁₂-His-X₁₋₇-**Z**-X₄; X₃-**B**-X₂₋₄-**B**-X₁₂-His-X₁₋₇-His-X₄; X₃-**B**-X₂₋₄-Cys-X₁₂-**Z**-X₁₋₇-His-X₄; X₃-**B**-X₂₋₄-Cys-X₁₂-His-X₁₋₇-**Z**-X₄; X₃-Cys-X₂₋₄-**B**-X₁₂-**Z**-X₁₋₇-His-X₄; X₃-Cys-X₂₋₄-**B**-X₁₂-His-X₁₋₇-**Z**-X₄; X₃-Cys-X₂₋₄-Cys-X₁₂-**Z**-X₁₋₇-**Z**-X₄; X₃-Cys-X₂₋₄-**B**-X₁₂-**Z**-X₁₋₇-**Z**-X₄; X₃-**B**-X₂₋₄-Cys-X₁₂-**Z**-X₁₋₇-**Z**-X₄; X₃-**B**-X₂₋₄-**B**-X₁₂-His-X₁₋₇-**Z**-X₄; X₃-**B**-X₂₋₄-**B**-X₁₂-**Z**-X₁₋₇-His-X₄; and X₃-**B**-X₂₋₄-**B**-X₁₂-**Z**-X₁₋₇-**Z**-X₄, (SEQ ID NOS:118-132, respectively) wherein X is any amino acid, B is any amino acid except cysteine and Z is any amino acid except histidine.

Paragraph beginning on page 7, line 19 has been amended as follows:

Thus, in preferred embodiments, one or more zinc coordinating fingers making up the zinc finger protein has any of the following sequences:

X ₃ - B -X ₂₋₄ -Cys-X ₁₂ -His-X ₁₋₇ -His-X ₄	(SEQ ID NO:118)
X ₃ -Cys-X ₂₋₄ - B -X ₁₂ -His-X ₁₋₇ -His-X ₄	(SEQ ID NO:119)
X ₃ -Cys-X ₂₋₄ -Cys-X ₁₂ - Z -X ₁₋₇ -His-X ₄	(SEQ ID NO:120)
X ₃ -Cys-X ₂₋₄ -Cys-X ₁₂ -His-X ₁₋₇ - Z -X ₄	(SEQ ID NO:121)
X ₃ - B -X ₂₋₄ - B -X ₁₂ -His-X ₁₋₇ -His-X ₄	(SEQ ID NO:122)
X ₃ - B -X ₂₋₄ -Cys-X ₁₂ - Z -X ₁₋₇ -His-X ₄	(SEQ ID NO:123)
X ₃ - B -X ₂₋₄ -Cys-X ₁₂ -His-X ₁₋₇ - Z -X ₄	(SEQ ID NO:124)
X ₃ -Cys-X ₂₋₄ - B -X ₁₂ - Z -X ₁₋₇ -His-X ₄	(SEQ ID NO:125)
X ₃ -Cys-X ₂₋₄ - B -X ₁₂ -His-X ₁₋₇ - Z -X ₄	(SEQ ID NO:126)
X ₃ -Cys-X ₂₋₄ -Cys-X ₁₂ - Z -X ₁₋₇ - Z -X ₄	(SEQ ID NO:127)
X ₃ -Cys-X ₂₋₄ - B -X ₁₂ - Z -X ₁₋₇ - Z -X ₄	(SEQ ID NO:128)
X ₃ - B -X ₂₋₄ -Cys-X ₁₂ - Z -X ₁₋₇ - Z -X ₄	(SEQ ID NO:129)
X ₃ - B -X ₂₋₄ - B -X ₁₂ -His-X ₁₋₇ - Z -X ₄	(SEQ ID NO:130)
X ₃ - B -X ₂₋₄ - B -X ₁₂ - Z -X ₁₋₇ -His-X ₄	(SEQ ID NO:131)
X ₃ - B -X ₂₋₄ - B -X ₁₂ - Z -X ₁₋₇ - Z -X ₄	(SEQ ID NO:132)

where X= any amino acid
 B= any amino acid except cysteine
 Z= any amino acid except histidine

Paragraph beginning on page 17, line 20 has been amended as follows:

A component finger of a zinc finger protein typically contains approximately 30 amino acids and comprises the following canonical consensus sequence (from N to C):
Cys-(X)₂₋₄-Cys-X₁₂-His-(X)₃₋₅-His [(SEQ ID NO: 2)] (SEQ ID NO:1)

Paragraph beginning on page 19, line 14 has been amended as follows:

Non-canonical zinc fingers therefore include one or more zinc finger components in which at least one of the C2H2 amino acids has been replaced with one or more amino acids. In certain embodiments, more than one of the canonical amino acids is replaced.

Examples of non-canonical zinc finger components include:

X₃-B-X₂₋₄-Cys-X₁₂-His-X₁₋₇-His-X₄ (SEQ ID NO:118)
X₃-Cys-X₂₋₄-B-X₁₂-His-X₁₋₇-His-X₄ (SEQ ID NO:119)
X₃-Cys-X₂₋₄-Cys-X₁₂-Z-X₁₋₇-His-X₄ (SEQ ID NO:120)
X₃-Cys-X₂₋₄-Cys-X₁₂-His-X₁₋₇-Z-X₄ (SEQ ID NO:121)
X₃-B-X₂₋₄-B-X₁₂-His-X₁₋₇-His-X₄ (SEQ ID NO:122)
X₃-B-X₂₋₄-Cys-X₁₂-Z-X₁₋₇-His-X₄ (SEQ ID NO:123)
X₃-B-X₂₋₄-Cys-X₁₂-His-X₁₋₇-Z-X₄ (SEQ ID NO:124)
X₃-Cys-X₂₋₄-B-X₁₂-Z-X₁₋₇-His-X₄ (SEQ ID NO:125)
X₃-Cys-X₂₋₄-B-X₁₂-His-X₁₋₇-Z-X₄ (SEQ ID NO:126)
X₃-Cys-X₂₋₄-Cys-X₁₂-Z-X₁₋₇-Z-X₄ (SEQ ID NO:127)
X₃-Cys-X₂₋₄-B-X₁₂-Z-X₁₋₇-Z-X₄ (SEQ ID NO:128)
X₃-B-X₂₋₄-Cys-X₁₂-Z-X₁₋₇-Z-X₄ (SEQ ID NO:129)
X₃-B-X₂₋₄-B-X₁₂-His-X₁₋₇-Z-X₄ (SEQ ID NO:130)
X₃-B-X₂₋₄-B-X₁₂-Z-X₁₋₇-His-X₄ (SEQ ID NO:131)
X₃-B-X₂₋₄-B-X₁₂-Z-X₁₋₇-Z-X₄ (SEQ ID NO:132)
X₃-Y-X₂₋₄-Cys-X₁₂-His-X₁₋₇-His-X₄ (SEQ ID NO:133)
X₃-Cys-X₂₋₄-Y-X₁₂-His-X₁₋₇-His-X₄ (SEQ ID NO:134)
X₃-Cys-X₂₋₄-Cys-X₁₂-Y-X₁₋₇-His-X₄ (SEQ ID NO:135)
X₃-Cys-X₂₋₄-Cys-X₁₂-His-X₁₋₇-Y-X₄ (SEQ ID NO:136)
X₃-Y-X₂₋₄-Y-X₁₂-His-X₁₋₇-His-X₄ (SEQ ID NO:137)
X₃-Y-X₂₋₄-Cys-X₁₂-Y-X₁₋₇-His-X₄ (SEQ ID NO:138)
X₃-Y-X₂₋₄-Cys-X₁₂-His-X₁₋₇-Y-X₄ (SEQ ID NO:139)
X₃-Cys-X₂₋₄-Y-X₁₂-Y-X₁₋₇-His-X₄ (SEQ ID NO:140)
X₃-Cys-X₂₋₄-Y-X₁₂-His-X₁₋₇-Y-X₄ (SEQ ID NO:141)
X₃-Cys-X₂₋₄-Cys-X₁₂-Y-X₁₋₇-Y-X₄ (SEQ ID NO:142)
X₃-Cys-X₂₋₄-Y-X₁₂-Y-X₁₋₇-Y-X₄ (SEQ ID NO:143)
X₃-Y-X₂₋₄-Cys-X₁₂-Y-X₁₋₇-Y-X₄ (SEQ ID NO:144)

$X_3-Y-X_{2-4}-Y-X_{12}-\text{His}-X_{1-7}-Y-X_4$	<u>(SEQ ID NO:145)</u>
$X_3-Y-X_{2-4}-Y-X_{12}-Y-X_{1-7}-\text{His}-X_4$	<u>(SEQ ID NO:146)</u>
$X_3-Y-X_{2-4}-Y-X_{12}-Y-X_{1-7}-Y-X_4$	<u>(SEQ ID NO:147)</u>

where

X= any amino acid

B= any amino acid except cysteine

Z= any amino acid except histidine

Y= any amino acid except histidine or cysteine